

POTOMAC VALLEY RADIO CLUB

est. 1947

APRIL 1993 NEWSLETTER

OFFICERS

PRESIDENT - K3NA ERIC SCACE (301) 293-2448
VICE PRESIDENT - WR3E BERNIE McCLENNY (410) 531-5423
SECRETARY - KE3Q RICHARD BOYD (301) 464-8014
TREASURER - ND3A ROBERT SHAPIRO (703) 204-2771
HISTORIAN - W3GN LAWRENCE FADNER (301) 725-1624

The Potomac Valley Radio Club meets the second Monday of each month, from September through May. Regular business meetings alternate between Northern Virginia and Temple Hills, MD. For directions to the next meeting, see below. Or call any club officer.

PVRC CHARTER MEMBERS: W3GRF, W3IKN, W4AAV (SK), W4KFC (SK), W4KFT, N0FFZ, W4LUE, W7YS, VP2VI (W0DX).

Charter Members are not required to pay dues.

VHF Repeater (K3WX): Output 147.00 MHz., Input 146.40 MHz.

UHF Repeater (K3WX): Output 443.15 MHz., Input 448.15 MHz.

Packet Cluster Contest/DX System:

145.51 MHz. Connect to W0YVA
145.57 MHz. Connect to N2FB
145.59 MHz. Connect to W3LPL
145.63 MHz. Connect to K3NA
145.77 MHz. Connect to N4SR

Next Meeting:

Date: 12 April 1993
Place: Church of the Nativity
Manchester Drive
Temple Hills, MD
Time: 1930 Hours EDST

Check with the packet cluster or the repeater for last minute changes, if any.

DIRECTIONS to the Temple Hills meeting:

Take the Capital Beltway to Exit 7-A. Head south on Maryland Route 5 (Branch Avenue) toward Waldorf. Immediately after entering Branch Avenue you will come to a stoplight, which is Manchester Drive. Turn right on Manchester Drive. In the middle of the block on the left hand side, you will notice the Church of the Nativity sign next to the church entrance. Go up the drive to the top and park in the church's parking lot.

PIZZA... AFTER THE MEETING:

Leaving the church, at the foot of the hill turn right to the first traffic light (Branch Avenue). Turn left on Branch Avenue. Proceed under the Beltway to the exit marked "St. Barnabas Road West." Proceed on St. Barnabas Road through the first light, then get into the left lane. Watch on the left for the neon sign saying Little Italy Pizza. Go to the first opportunity for a U-turn and return. Park in the Little Italy Pizza parking lot.

Editor: Fred Laun, K3ZO (301) 899-1235

News Deadline: 20th each month.

MUSINGS OF THE EDITOR...

Well the ARRL phone and CW DX contests of 1993 are history, and this year the weather proved to be more of an enemy than sunspots. K3NA lost all of his HF antennas, while the monster 4-el 40 meter beam at W3GRF, perhaps the area's largest ham antenna, came crashing down. K3ZJ/8's West Virginia mountaintop 15 meter beam was another casualty, dashing Dave's plans for the ARRL phone weekend. K3SA was overheard complaining about a rotor failure which left his antenna acting like a weathervane. Up in Frankford territory damage was apparently even worse, judging by some of the packet traffic after the contest. Here at K3ZO damage was fortunately limited to one-half of one director on the six meter beam falling to the ground, one of the advantages of living in a valley, I guess. Storm-assisted line noise was my biggest enemy.

Conditions themselves were quite OK for this point in the sunspot cycle. Bernie, WR3E, was again breathing down my neck. Our Secretary KE3Q's skills as a recorder of public events will be evident to you in his account of the March meeting, where an amazing amount of the flavor of the comments on the contest are made available to the reader who was unable to attend the meeting. FB Rich!

I made a comment in the last bulletin about the single-operator-assisted category being for people who have more modest stations not normally capable of running stations. One exception I know of is Chas, K3WW, my fellow editor (of the *Frankford Newsletter*). Chas seems to have figured out the right mix of running stations and search-and-pounce hunting, as his score is consistently up there at or near the top in that category. Though Chas doesn't like to reveal his operating secrets in his rag, I would assume that they amount to something like ignoring the packet box until your run rate drops below a certain level, say 60 per hour. At any rate, Chas has discovered the secret formula and is staying with it.

There was a full-page tribute to Fred Friel,

W3FU, our recently-departed member, in *W5Y/Report*. I hadn't realized that he had been pressuring ARRL to withdraw its Washington lobbyist (W1UED) from the scene. Funny, I had always been critical of ARRL when it didn't have a lobbyist here; hard to understand Fred's reasoning on this one. At any rate, RIP Fred Friel...

I got my printout back from ARRL crediting me with the DXCC additions I put in at last fall's DXPO 92. Having been critical of the League for underestimating the difficulties of computerizing the DXCC system and for misplacing the blame in some cases, I will now add that I think ARRL is "over the hump" on this one and it would appear things are gradually getting back to normal.

By the time you read this the WPX SSB Contest will have come and gone. Hope that it was a good one, although conditions have been pretty disturbed as I write this. CU at the April meeting!

You will note that we are back to "low tech" graphics in this issue. Unfortunately there developed a disagreement between Ben, AA4XU, and myself over some aspects of the Newsletter. It would be unfair to him for me to give my version of what happened here without his version also being presented. Ben stepped in and made a mighty contribution in this Newsletter's hour of need, and his graphics had drawn wide praise from the membership as well as out-of-the-area readers, including a note I just received from Larry Price, W4RA, Secretary of the International Amateur Radio Union. Thank you, Ben, for your fine work!

As a corollary of my difference of opinion with Ben, Howard, W6AXX, has resigned as Circulation Manager. Howard has put long hours of hard work into this publication over the last several years. The special arrangements he made with HRO, MRC and K3WX saved the Club considerable money in the production of this publication. Many thanks, Howard!

THE SECRETARY'S PAGE

by Rich Boyd, KE3Q

Regular meeting, 8 March 1993

The meeting was called to order by President K3NA at the Tyson's-Pimmit Library, Falls Church, VA. The minutes for the February meeting were approved as printed in the Newsletter.

Those present, in order of sign-in, were:

KE3Q, KT4W, KT3Y, W4JVN, AA4XU, W6AXX, K3ZO, W3AZ, KA4RRU, KJ4VG, KO4FM, W3ZZ, W9LT, AI2C, KO0U, WR3L, WB1J, K3SKE, K3IXD, K07V, N3KTV, W4RW, WR3Z, WZ3Q, ND3A, WR3E, N4MO, W0RUE, K3NA, K0OO, KH2F.

The six guests among the above were: KJ4VG, KO4FM, KO0U, WB1J, N3KTV and K0OO

Membership applications were accepted from KJ4VG and KO0U. Action on the applications was held until the next meeting when we ran out of time and the library where we meet was closing at 9!

The meeting started with a viewing of the VP8SSI South Sandwich video, courtesy of ND3A.

I handed out two documents, "Special Interest Clubs" and "Sound Like a Good Operator, Give Your Full Callsign." I wrote these for the purpose of circulating them to local clubs.

"Special Interest Clubs" informs them of the existence of PVRC and NCDXA, which I like to generically call, for this purpose, "the contest club and "the DX club." I think that's less confusing to local club people, states what we are, etc. I don't want them to think there's a club loyalty type conflict, etc. I view this document as a recruiting tool for the contest club primarily, and threw the mention of the DX club in, since I think many, many local club members are interested in these two special

areas but have no idea of the existence of these clubs, or if they do, have no idea when and where they meet, that they're welcome, etc.

"Sound Like a Good Operator..." was prompted by local club repeater guys using partial callsigns extensively. It bugs me, so I decided to try to do something about it, at least information-wise. One op. enters a QSO with his suffix and very often goes a whole QSO and/or ten mintues or more without ever giving his prefix, and signs off with his suffix! Another 2x3 callsign slurs it together so much (practically one syllable) that many people who talk to him often on the repeater don't know what his call is!

Anyway, on these two documents, consider them drafts. I solicit your input on what to add, delete, or modify. You are welcome to distribute them to your local club or others if you find them useful. If you have pet peeves of your own you'd like me to add, I'd be glad to consider it.

WR3L also has a document letting people know about the PVRC, designed for distribution at hamfests. It's excellent. Also useful -- I passed a few out to our guests at the meeting -- is WZ3Q's "History of the PVRC" three-pager. So, we have several recruiting documents available. We urge you to make copies and pass them out. If you don't have Xeroxing facilities, I can make copies for you.

The bulk of the meeting program was a go-around of everyone's comments, highlights, etc., from the ARRL DX contests. Here's a summary:

WZ3Q: Worked a bunch of V85's and five JT's back to back at W3LPL. Thought on CW the conditions were more even, the peaks not as high, the valleys not as low.

WR3Z: Operated 80 meters at W3LPL.

N4MO: Was at VP5U for CW, single band 15. Whenever VP5F (KR0Y) came up on the band I had to go way up to the high end, as he was line-of-sight to me.

WR3E: At N2FB up against Fred (K3ZO). He got me. On phone, the punishment wasn't as bad. Got closer. Observations:

1. Fred is a good op.
2. You have to hit all bands.
3. You have to be on 10 on Saturday if it's open because it may not open as well Sunday. Sunday conditions may be poor.
4. It's not a good idea to try and go without sleep. I was dragging by midnight Saturday. Used a DVP but never got it programmed right.

KT3Y: WR3E wasn't beaten up too badly with 2.7 M compared to Fred's 2.76 M.

K3ZO: He's getting closer. I enjoy the competition. It pushes me.

WR3E: Moving people worked well -- sending people high in the band (until I ran into a net frequency).

K3ZO: Bernie is more competitive since he switched categories from single op. assisted to single op. unassisted.

W3ZZ: Bernie spent more time CQ'ing and less time chasing mults and that helped his score. Bernie was only 80 K. behind Fred on CW also.

WR3L: Spent 8 hours QRP on 10 and made 207 QSO's.

K3SKE: Was on the W3GNQ M/S Team with W3GNQ and W3ZZ, 1.7 M.

KO7V: 10 Meter op. at W3LPL on CW. First time in the big leagues. Noted the Southwest path to JA, etc. JA's don't come in from that direction with a little tribander.

K3NA: That demonstrated that there are two kinds of ionosphere (what the big station gets.)

and what the little station gets.)

KO7V: Some Europeans do come through on 40 meters at 1:30 p.m. Looking forward to going back to W3LPL.

K3IXD: First time contributing to the PVRC's club score. Live one mile from W3LPL, apparently to the east because when W3LPL beams Africa on 15 meters I have to change bands. Europe comes in from the East on 10 sometimes and you should watch your S-meter and not your beam heading. Re CT: Be sure to change all those Spratlys in your log back to S5's before submission to ARRL. (The callsign will still show S5 but the country credit shown elsewhere will be Spatly otherwise). I also, by the way, made all the OM prefixes = 3Y and that picked them all up too.)

W3ZZ: There's a dense ion cloud over PY0P and signals bounce off that and you can also work deep Asia, like 9V1, in the same direction, like on 20 meters at 11 AM and you can move them to 10 meters and work them.

KO7V: 9V1ZE called during the EU run on 10. Passed him to K3NA operating W3LPL on 15.

K3ZO: YB0BTJ called in on 10 on Sunday while I was beaming due east and working Italy. But couldn't work a G that day.

N3KTV: Did some fill-in Sunday morning at W3LPL. Hope to upgrade soon.

AA4XU: Single op. both weekends. Saturday was great, Sunday was poor. K3ZO was the only one not complaining of snow static because he had a quad. Heard a very loud KP4 using only 5 watts.

K3ZO: Both weekends were pretty good. Had line noise. Had best run hour ever, 151 on 15 meters Saturday morning. Think the European contestants are getting pretty good (as operators) and that helps keep the rate up, snappy CQ answers, etc. Worked seven JT's. Tried to get the HS boys cranked up to get on and they showed up. Mail contest news to a friend in HS who distributes it at the local club. Worked 5-watter G4DBL on 40 and 80 SSB.

A G0 told me he worked 1200 W's on Saturday and none on Sunday on 10 due to the propagation change. Italy was over-represented on Sunday. Might have to take a Berlitz Spanish-to-Italian conversion course. Delighted to have the competition from WR3E.

W3ZZ: Maybe you'll have to buy a real radio (referring to Fred's TS-830).

K3ZO: W3GRF will loan me his FT-1000 to try.

W3AZ: Lots of additional multipliers this year. Notes an SU was way up among the packet signals sending 15 wpm CW.

KE3Q: Highlight: KJ4VG sounding like *Hans und Fritz* saying "Mary-lahnd". KE3Q M-2 effort with KA4RRU, KJ4VG and N3MIL feeding us was fun but never got the computers networked.

KT3Y: Phone, with C-line and no DVK, was hopeless. Bagged it after a couple of hours. On CW went single-band 20 and rivaled W3LPL's single band score using just Lazy-H arrays from home (four of them, they're bi-directional so that covers eight directions by flipping a switch). Instant direction-changing was a plus. Wanted to see if a modest station could compete with the big boys and convinced it can. Think LPL's big antennas gave 10-12 QSO's more during sunrise and sunset periods. On SSB learned I'm not as loud as I thought I was. Speculate that on SSB more people are "stacked up" on frequency calling the DX station, whereas on CW signals are spread out a little more. Few stations on CW call precisely on frequency. I have an advantage on CW with the C-line being able to call precisely on frequency. JA's sometimes louder due north than NW. The path seems to shift day-to-day.

W4JVN: Busy building a house but have upgraded computer from VIC-20 to a 486! Experiencing CT and DXBase for the first time. Found old QSL from K1LPL/G. Hope to contest more seriously next year in the new house.

KO4FM: From Woodbridge Wireless. Made some QSO's in the contest but new at it.

Hope to get code speed up.

KJ4VG: Ate well at KE3Q. Highlight: Getting answers from HS and YB while operating SSB at KE3Q. Another highlight: V7A, five watts and loud.

KT4W: CW at G0MFO using the call GB5CW. You can get a special English callsign if you're celebrating something -- like a contest weekend! It was odd to start the contest at midnight. WR3E loud on 40. K1AR (K1EA) absolutely loudest and always aggressively saying: "work me, work me, work me!" Hard to find N2RM, didn't even know they were there. Difference in signal strength between K1EA and other multis was significant. Told G0MFO that when he moves to California he'll be 800th in line in pileups with a two-element quad at 30 feet. W3LPL was heard thirty minutes before the band opening but couldn't be worked until then. UB5's and others with crappy signals were loud all the time (kind of like Texas for W3's I guess). Had a 150 rate from G on 15 when the rest of EU had already gotten dark, just after dinner in G. By 1900Z the 15 meter run was over. Notes GD0SLY's (K3RV) 150 hour on 160 from GD4BEG station with 160 meter verticals.

W3ZZ: At W3LPL on CW. N2RM score announcement halfway through CW weekend took some of the wind out of the LPL sails but made us work harder from then on. Every fall W3GNQ invited me to operate there. This year on phone I did. Knew if I went to W3LPL I'd be forced to operate 80 meter phone. So decided to "go native" with W3GNQ. It takes "two men and a boy" to change bands with GNQ's amp., something built years ago out of the *West Coast Handbook*. K3SKE says it's "positive step action switches". First time using an FT-1000 and the first time my ears weren't ringing after a contest and I wasn't tired. But it played well. Surprised that an ordinary station can "act like LPL" and get in pileups and kick peoples' butts. I can still bray with the best of them in phone pileups like the one on 75 on 7X2DG when I got the feeling like Luke Skywalker that "the force was with me." (I knew he was coming back to me even though the unruly pileup wouldn't let anybody

hear who he was coming back to). In a pileup like that every now and then you hear a second-and-a-half of silence and your callsign coming back. With W3GNQ's amp you really thought twice about switching bands.

W9LT: At K3ZJ's West Virginia mountaintop QTH for CW. Snow static was S9 + 20. Got off mountaintop before getting snowed in, two-thirds of the way through the test, single band 15. Snow and ice also caused some problems with the antennas. Snow and ice caused damage before the phone weekend which prevented K3ZJ from putting in a full effort.

AI2C: First CW effort. More DX stations have amplifiers and there are more strong DX signals, especially on 20.

KO0U: TVI problems caused me to mostly stick to the low bands on CW. My neighbor complained of TVI when I ran only 10 watts on 40 meters to an inverted vee, so I ran 1500 watts to my mobile antenna parked 50 feet

away and got no interference complaints (of course my neighbor doesn't talk to me any more anyway) despite the Van de Graaf machine-like lightning traveling up and down the HF mobile antenna until I added a corona ball.

The meeting then adjourned to the nearby Pizza Hut, where K3NA entertained us with photos of snow/ice/wind damage the Thursday before the phone contest at his QTH. He lost his tribander and delta-loop array. Towers and guy wires (and the packetcluster antennas) survived despite trees laying across at least one guy wire. One large tree or two fell just short of the house, but a balcony or two were messed up. Eric also drew us diagrams of his current tower complement and hopes for a couple more in the future.

WR3E and KE3Q discussed their experiences with the DVP, which is featured in a separate article (below).

USING THE K1EA DIGITAL VOICE PROCESSOR

by Rich Boyd, KE3Q

Re the DVP, I recorded 25 megabytes or so of callsign prefixes and suffixes. It seems to select the prefix first so it comes out with a "delta-lima-one" no problem. Then it selects a two-letter combination for the suffix, no problem. It's the last letter on a 2 x 3 callsign that gets orphaned, sounding something like this: "delta-lima-one (slight pause) bravo-delta (slight pause) quebec!" If you don't get the intensity level, voice pitch, and things like that to match pretty close when you record, it sounds like a crazy person yelling out the callsign. I redid mine a couple of times and am satisfied with the result. Yes, it's more choppy than live voice, but I find it a lot of fun to have available. I use it when I feel like it and don't when I don't. Nobody insulted me when I used it on 'em. A few did seem to repeat their callsigns again when they didn't need to, though, after hearing it, even though I had it right. I think hearing it come back to them a

little odd confused them momentarily, leaving them wondering if it was really their call they heard or not, even though it was correct.

K3NA wonders why I recorded everything phonetically, which I did, since we're almost entirely talking about CQ answers here, and they know what their own callsign is. Why didn't I just record non-phonetic letters? Why didn't I think of that? I think he's right. So now I'll record another batch the obvious way and see how it sounds. When you're search and pounce you're just yelling your own call anyway, not the other guy's. I think KM9P had it phonetically at Dayton when demo'ing it and I just blanked out and followed blindly.

Getting the audio levels adjusted right, etc., was tricky and I always got crummy signal reports, possibly because of RFI distorting things or just bad level adjustments. At least

here, adjusting the audio was a critical adjustment. Not so with the DVP. I even sprung for factory cables to make my life easier and haven't regretted it one bit. Definitely plug and play. CQ'ing was tremendous with it, the message easy to change. F1 was the CQ. I used F4 a lot which had just my callsign for S&P and recorded alternative S&P KE3Q's on F6 and F7. When S&P I'd keep my hand over F4 and F2, my callsign and my report, and that's all I needed to do.

N3MIL (my XYL) has expressed interest in operating some next time, so we'll probably get her voice in there for CQ, callsign and exchange and the other guy's callsigns, etc. and we can get the XYL voice advantage even when she's not operating hi. Would be fun to experiment with, anyway, and amusing to boot. Maybe we'd better use F6 or F7 for "roger, roger" or something in her voice for

those times when the other station asks us a question that otherwise would require a live answer from a non-XYL voice. hi

The function keys are a lot nicer to push than stock DVK inbaord keys which, as one review said, as I recall, need a better tactile response. (You could always have WZ3Q install old-fashioned pushbuttons and hook them to your DVK terminals, as I did -- ed.)

WR3E and K3ZO commented on hearing the punchy KE3Q DVP callsign and CQ, etc., which they seemed to say was distinctive because I punched it up a bit and left a pause between each letter. Wouldn't have even been able to keep up the intensity if it had been live. Not a hint of RFI, etc. on it throughout the weekend. Love it. My DVK frustrations of the past seem to be solved.

SCORES... SCORES... SCORES...

by Bernie McLenny, WR3E

ARRL DX CONTEST CW SCORES for PVRC:

Call	Category	QSOs	Band-Countries	Score
K3ZO	SO	2122	397	2,527,302
WR3E		2204	370	2,446,440
W3AZ		658	265	523,110
W3HVQ		771	217	501,921
WF3J		589	247	436,449
W3IUU		565	253	428,835
W3GN		616	231	426,888
KE3Q		660	?	?
K4FPF		444	213	283,716
AA4XU		444	195	259,740
AI2C				225,000
W3CPB		268	141	112,941
WD3P		81	72	17,496
K7SV	SO/LP	1061	343	1,091,769
W9LT/8	15M	1024	92	282,624
KT3Y	20M	1518	109	495,405

K8OQL	80 M	112	46	15,456
N3II	SOA	761	357	815,031
K3SA		788	279	659,556
KZ3H		630	258	487,620
K3SKE		158	136	64,464
W3LPL	MM	5208	602	9,405,648
W3GG	MS	1706	367	1,878,306
K3DI		1200	350	1,200,000
TOTAL	26 LOGS			

ARRL PHONE DX Scores, PVRC:

Call	Category	QSOs	Countries	Score
K3ZO	SO	2285	403	2,762,565
WR3E		2068	436	2,704,944
AI2C		980	277	800,000
N3UN		710	274	583,620
K8OQL		414	222	275,724
AA4XU				
KT3Y				
W3AZ				
W3UJ	SO/LP	786	259	611,499
KZ3H	SOA	624	314	586,866
N3II		593	313	556,827
K3IXD		523	262	411,078
K6IR		355	237	252,405
N4KW		270	148	119,880
WR3L	10 M	270	106	85,860
N4MO	15 M	750	113	250,000
N3JT		95	95	27,075
W3GNQ	M/S	1427	403	1,725,243
KE3Q	M/2	1718	451	2,306,865
K3DI		989	398	1,180,866
W3LPL	M/M	5469	689	11,304,423
TOTAL	21 LOGS			26,545,740
GRAND TOTAL	47 LOGS			50,885,193



HAM RADIO OUTLET

ALINCO

DR-600T

2M/440 FM Transceiver



WOODBRIDGE, VA 22191
14803 Build America Dr.
(703) 643-1063
(800) 444-4799

Phone Hours: 9:30 AM to 5:30 PM
Store Walk-In Hours:
10:00 AM to 5:30 PM Closed Sundays

-NEW ADDRESS-

ANAHEIM, CA 92801

933 N Euclid St

(714) 533-7373

2000 2000 6046

Jim Rafferty N6RJ Mgr
Near Disneyland

OAKLAND, CA 94606

2210 Livingston St

(510) 534-5757

4000 2000 6046

Rich WASWYB Mgr
I-880 at 23rd Ave ramp

SAN DIEGO, CA 92123

5375 Kearny Villa Rd

(619) 560-4900

(800) 854-6046

Tom KM6K Mgr
4000 163 &
Claremont Mesa

-NEW ADDRESS-

SUNNYVALE, CA 94086

510 Lawrence Expwy. #102

(408) 732-3295

1000 2000 6046

Tom KB6LUC Mgr
Lawrence 1000

So. from Hwy 101

VAN NUYS, CA 91411

6265 Sepulveda Blvd.

(818) 988-2212

(800) 854-6046

Jon K86ZB1 Mgr
San Diego 2000
at Victory Blvd

Bob Ferrero W6RJ

President/Owner

Jim Rafferty N6RJ

Vice President

AZ, CA, CO, GA, VA residents add sales tax.
Prices, specifications, descriptions, subject
to change without notice

ALINCO

DJ-580T

2M/440 Dual Band



40 Mem Channels
DSO, Dual Display
CTCSS Enc/Dec Built-in
Cross Band Full Duplex

CALL FOR
SPECIAL
LOW PRICE

YAESU

FT-990



YAESU

HANDHELDS

FT-415/FT-815

2' Mtr. 440 Mhz

2W 2M/1.5W 440
5W optional
Direct DC Input
Built-in VOX, 41 Mem.
DTMF paging, CTCSS built-in



FT-530

2M/440MHz

2W standard, 5W opt.
82 Mems, Dual In-band Rx

KENWOOD

TS-850

HF Transceiver



Advanced Technology Performance
108 db Dynamic Range, Optional DSP

CALL FOR LOW PRICE

KENWOOD

HANDHELDS

TH-28A

2M/2.5W DTSS

240 Mem. w/optional
mem. unit

UHF/VHF



TH-225A

2 MTRS/5W

TH-315A

220MHz/2.5 W

CALL
FOR
GREAT
PRICES

TH-48A

440/1.5W DTSS

240 Mem. w/optional
mem. unit

2 MTR RX



IC-735



ICOM

HANDHELDS

IC-2GAT

2 Meter HT • 7 Watt

IC-4GAT

440 MHz • 5 Watt

IC-W2A

Deluxe Duo-Band

Wide RX Band HT

IC-2SAT, 2 Meter

IC-3SAT, 220 MHz

IC-4SAT, 440 MHz

IC-24AT, Duo Band

IC-2SRA, 2M + Wide Rx



100W 12 volt • 12 channel memory
General Coverage • IF Notch & QSK
CALL FOR LOW PRICE

EDITOR PVRG NEWSLETTER
ALFRED A LAUEN III K320
P O BOX 31097
TEMPLE HILLS MD 20757-0097

PVRC NEWSLETTER APRIL 1993

F I R S T C L A S S

Editor
Fred Laun, K3ZO
P O Box 31097
Temple Hills MD 20757-0097